THE OPTICAL MAGIC LANTERN — JOURNAL — AND PHOTOGRAPHIC ENLARGER.

EDITED BY J. HAY TAYLOR

Vol. 2.—No. 23. [Entered at Stationers' Hall.] APRIL 1, 1891. Price One Penny.

CONTENTS.

	PAGE.
Notes	99
Fantoccini Slides	100
Hand Cameras for Obtaining Slides for the Lantern—No. 11	100
Pressure Gauges	101
Experience with Ethoxo Lime Light	101
Electric Incandescent Lamps for Optical Lanterns	102
Hints on Enlarging	102
Flame Extinguishers and Method of Testing	102
Flashes on Lantern Topics ...	103
Ether Saturators	104
On "Pressure's" Riddle and Regulators in General ...	104
Fluid in Gas Cylinder	105
Correspondence.—The Lantern for Suffering Humanity—The "Ethoxo Light" ...	105
Notes and Queries	106

CONTENTS OF No. 22.

Notes—Triple Lantern Condensers—The Lantern for Suffering Humanity—Hand Cameras for Obtaining Slides for the Lantern (No. 10)—Hints on Enlarging—How I Became a Lanternist (No. III.)—Experiences with the Ether Oxygen Light—Lantern-slide Making—Comments—Editorial Table—Society Meetings—Correspondence (Fluid in Gas Cylinder—Griffiths' Reducing Camera—A Mystery)—Notes and Queries.

Notices.

THE *Optical Magic Lantern Journal and Photographic Enlarger* is issued on the 1st of every month, price One Penny, and may be obtained from all Newsvendors, Railway News Stalls, Photographic Dealers, or from the Publishers, at the following rates, post free :—

		Continental.	United States.
12 months ...	1/6 ...	2/	60 cents.
Single copies ...	/1½ ...	/2	6 „

Advertisements (Scale of Charges), displayed :—

	£	s.	d.
Front and back pages, by arrangement.			
Ordinary page, facing matter (whole) ...	3	0	0
„ „ ... ... (half) ...	1	15	0
„ „ ... ... (quarter) ...	1	0	0
„ „ ... ... (eighth) ...		10	0
„ „ per 1 inch in column ...		6	0
„ „ „ ½ „ „ ...		3	0

Special quotations for a series.

Exchange Column, General Wants, &c. (not Trade)—

First 20 words, 6d.; and for every 3 additional words, 1d.

Advertisements must reach the office not later than the 24th of each month. All cheques and postal orders to be made payable to Taylor Brothers.

Editorial communications must be addressed, The Editor; advertisements and business communications to Taylor Brothers, care of the Publishers, Dorset Works, Salisbury Square, Fleet Street, London, E.C.

American Agents:—The International News Co., 83 and 85, Duane Street, New York City.

Notes.

THE Princess of Wales (who by-the-by is a reader of the *Optical Magic Lantern Journal*) intends decorating a tea service of sixty-three pieces with photographs taken in Scotland by Her Royal Highness.

* * *

Scenes from the Life of the Rev. John Wesley is the title of a new set of sixty slides, introduced by Messrs. York and Son.

* * *

WE have been requested to announce that a new society, the Liverpool Camera Club, now hold its ordinary meetings in the rooms of the Liverpool College, Shaw-street, on the second Wednesday in each month, at eight p.m. Mr. W. Tansley's (hon. sec.) address is 14, Wentworth-street, Liverpool.

* * *

THE Yorkshire College Photo Club will hold an exhibition of apparatus on 30th inst.

* * *

SOME months ago we suggested the use of the lantern in photographic studios from an ultimate business point of view, and find that this idea has, in many cases, been taken up. We recently had the pleasure of attending an *At Home* given by Mrs. Gabell and Mrs. Fenton, of the firm of Gabell and Co., at their photographic studios, 22, Ebury-street, S.W. With music in the reception rooms, and the lantern in the operating studio, a very pleasant evening was passed by those favoured with an invitation. We learn that a series of *At Homes* are to be given.

* * *

THE Liverpool Exhibition (thanks to the energies of Messrs. Lange and Mayne) is a great success. As usual the lantern demonstration department is well patronised. Two lectures are being given to large audiences each evening. The manipulation of the lanterns is in the hands of the well-known firm, Messrs. Archer and Sons, which is equivalent to saying that everything is carried out with great perfection.

THE judges for the National Photographic Exhibition (Crystal Palace) are:—Messrs. Frank Atkinson, Val Blanchard, F. P. Cembrano, F. M. Good, Frank Howard, Phillip H. Newmanly. Scientific Lanterns: G. Baker-Cresswell, T. E. Freshwater, C. E. Gladstone, R.N., E. M. Nelson, F.R.M.S. Great credit is due to Mr. S. G. Buchanan, Wollaston for his untiring efforts in connection with this exhibition.

* * *

MESSRS. THEOBALD & Co., of Kensington, have, owing to the rapid increase of their business, been compelled to obtain larger premises. They intend moving on the 15th to a five-story building at 43, Farringdon-road, E.C.

Fantoccini Slides.

MOST people are familiar with marionettes as used upon a miniature theatrical stage, but few have witnessed a puppet show at which the figures have been projected with the optical lantern.

We have inspected a variety of slides and figures—the invention of Mr. W. Cheffins, of Holbeach, Lincolnshire—in which the motions and gestures are excellent. The slides are of two characters: one with a set scene, such as a performing acrobat, sawyers at work, men fencing, &c., whilst the other style consists of a special form of carrier, with separate backgrounds and figures, which come and go upon the scene as desired. In the case of a figure appearing, each movement of nature is imitated as closely as possible, and the puppets do not slide, but walk into place.

To describe such figures is somewhat difficult, as each is specially prepared for the performance for which it is intended. The figures are cut out of mica, painted in transparent colours, and joints are made at the neck, arms, legs, &c., so as to give as natural an aspect as possible. Levers, cams, and springs, all of delicate construction, are communicated to each joint, and so artistically is the colouring performed that the subjects are shaded in such parts where any lever or spring is situated, so as to make them unnoticeable. As an instance of what one particular figure is capable of doing, we caused it to walk across the scene, with a walking-stick in hand, and take a seat upon a chair. Most of the movements of the figures can be performed by various movements of one prime lever.

Many of the acrobatic forms of slides are worked in another manner, and we shall describe one in which a man, whilst lying on his back, pitches a barrel about in the air with his feet. In this case the surrounding scene is painted on a glass, whilst immediately in front is fastened the man, lying on a cushion (everything except the scene being made of mica). The hips and knees are jointed, and work rather loosely. As the slide must of course be placed in the lantern upside down, the legs remain distended, and, to furnish additional weight, those parts representing the shoes are made of brass. A small hole is provided at each toe, through which fine human hairs are passed. The ends of these are fastened to the mica barrel, whilst the others are secured to the end of levers at the top of the slide frame. In order to perform, a finger is pressed upon each lever, which causes the barrel to be drawn up, and as it cannot pass beyond the toe, the leg is thus bent. By the judicious use of each lever very realistic effects can be given by the performer.

The introduction of these forms of slides will be hailed with delight by the juveniles, and perhaps by many who have long since passed that stage.

We understand that these slides, although somewhat complicated, can be produced at a price which will enable them to become popular with that portion of the fraternity who use the lantern for amusement.

Hand Cameras for Obtaining Slides for the Lantern.

	"Facile"	(Fallowfield)	see	March 1st, 1890.
No. 1	"Giah"	(Mawson & Son)	,,	May 1st, ,,
,, 2	"Quadrant"	(W. H. Humphries & Co.)	,,	June 1st, ,,
,, 3	"Eclipse"	(J. F. Shew & Co.)	,,	July 1st, ,,
,, 4	"Eureka"	(W. W. Rouch & Co.)	,,	Aug. 1st, ,,
,, 5	"Key"	(Platinotype Co.)	,,	Sept. 1st, ,,
,, 6	"Optimus"	(Perken, Son & Rayment)	,,	Oct. 1st, ,,
,, 7	"The Griffin"	(Griffin & Sons, Limited)	,,	Nov. 1st, ,,
,, 8	"The Swinden-Earp" Patent		,,	Dec. 1st, ,,
,, 9	"Collins"	(C. G. Collins)	,,	Feb. 1st, 1891.
,, 10	"Kodak"	(Eastman Co.)	,,	Mar. 1st, ,,

NO. II.—"THE GUINEA."

NO one interested in hand camera work need be without a camera, when a useful instrument can be purchased for the small sum of one guinea. This camera, which carries its price as its name, is the product of Walter Griffiths and Co. (Limited), Highgate-square, Birmingham.

It takes ¼-plates, and is fitted with dark slides, achromatic lens (f. 9)—ground and mounted by this firm—and vulcanite shutter.

The camera holds three double dark slides of millboard, bound with metal, the draw-out slides being made of zinc chemically stained; they are very strong, and so rigid that they might at a glance be mistaken for wood. Upon each dark slide is stamped a number.

On a camera of this price one cannot expect to find elaborate brass lens mounts and fittings, but everything is so carried out that the optical arrangements may be perfect without any unnecessary show, and with a view to simplicity of parts, the frame portion of the shutter and the stop of the lens are formed of the same piece of metal, and it is on this that the shutter slides.

The shutter, when set, is held in position by a small hook clip, which also acts the part of a spring to retain the shutter on its return. After being released, the shutter flies upwards by the force of an elastic band, but no sooner has it done so than the band disengages itself, and another causes its immediate return. All this is done in the fraction of a second, and with great certainty.

A pneumatic fitting can also be used with this form of shutter, which enables time as well as instantaneous exposures to be given.

This camera (see cut), which resembles a small sample case, accompanied us during the Easter holidays, and we found it capable of doing excellent work.

——:o:——

Pressure Gauges.

MESSRS. NEWTON & CO. in writing to a contemporary have furnished the following valuable information for ensuring safety with pressure gauges :—

"There should be no cast-iron in the gauge : the tube and works should be mounted on a brass or gunmetal frame. The glass covering the dial should be mounted in a ring, fitting on the body of the gauage like a cap ; when the gauge is in use this cap should be removed, thus avoiding all danger from the broken pieces of glass. The gauge should then be inclosed in a brass wire cage, so that, should the tube burst, any portions of metal would be caught by the wire network, and, if not stopped altogether, would at any rate be rendered harmless,

"Our *employes* are constantly using gauges for testing gas bottles, and we have always had our gauges made in this way to avoid any risk from accident. The screw valve of the bottle should not be turned on full, one complete revolution of the screw is quite sufficient ; this greatly minimises the risk of fusion caused by friction, as the cylinder would probably take a quarter of an hour to empty itself. Of course the same gauge should never be used for both oxygen and hydrogen cylinders."

——:o:——

A CLOUDY or rainy day permits the making of slides as good as those made with a strong light. It is only necessary to use a much larger stop, or a longer exposure, or both.—*V. L. Davey.*

Experience with Ethoxo Lime-Light.

BY ALFRED PUMPHREY.

I SHOULD like to reply to the letter of your correspondent, Mr. C. G. Norton. He thinks he has "taken every known precaution ;" on the contrary, I think, from what he says, he has had little real experience of what writes about. The ethoxo light is quite safe in the hands of a competent man, who has suitable tools and has proved them ; a candle is a dangerous thing in the hands of an infant.

First of all, your correspondent does not use a pair of *tested flame extinguishers*. I enclose particulars of how these are tested. With these, had the mixture become explosive from want of ordinary precaution, the explosion would not have been alarming in a crowded room.

The cause of your correspondent's explosion was that the oxygen did not take up enough of the ether, either owing to the vapouriser being too small, or from a reduction of temperature caused by the continued evaporation of the ether, or from the vapourizer being used in too cold an atmosphere.

In using gas from a cylinder it should be borne in mind that as the gas expands it falls in temperature, exactly in the same way as it rose in temperature as it was compressed, and that a low temperature is unfavourable to the complete saturation of the oxygen with the vapour of ether.

It does not, therefore, follow that instructions which are adapted to the use of gas bags will answer equally well with gas from a cylinder, unless the operator uses his judgment and increases the temperature by some such plan as applying a little heat in the shape of a hot water bottle, or a hot brick, and enveloping the whole in a woollen cloth.

I say that the ethoxo light is safe in competent hands, with suitable tools, by a man that has proved them. By that I mean one who has experience with his tools under different conditions. Because a light is all right when first started, it is not safe to conclude that it will be right after working for two hours ; it must be proved for the time it is expected to burn. The correspondent should never have come near the condition he describes—of the vapour giving light without the addition of pure oxygen. He speaks of precautions recommended by the sellers. I cannot, of course, say what others recommend ; but certainly he has not followed the precautions which I give in my little pamphlet, "Lantern Manipulation." There is one other point in which I think your correspondent does exactly the opposite to what I have found best. He says he "made the adjustment at the jet and not at the cylinder." I find the proper way is to make the adjustment at the inlet of the vapouriser, so as to prevent any contamination of the supply of pure oxygen. I have always found this an important item. If the correspondent will give the measures of the apparatus he used, I should be able to say if the fault lay with the tools or the conditions.

I shall be pleased to explain in next issue the conditions of safety as I have learned them from some years of trial.

Electric Incandescent Lamps for Optical Lanterns.

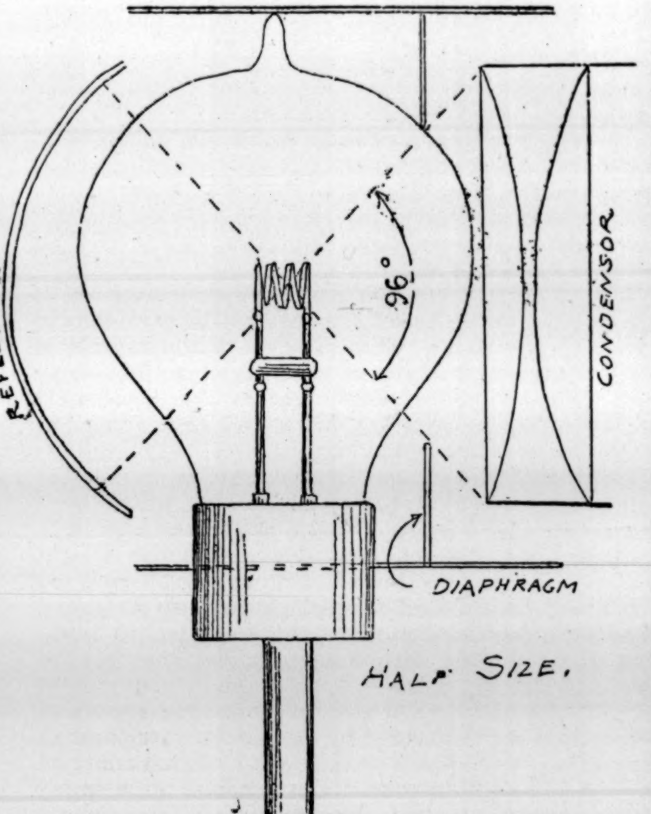
By H. Padgham (Greenwich.)

Now that many of our halls and private houses have the electric light fitted, and that still more will have it in future, it has become possible and convenient to use it for optical projection. It does away with all gas bags, cylinders, and explosions.

In some few cases an arc light could be used, but as a rule the hall or room would be fitted and the leads arranged for incandescent lamps, and the lead would not be large enough to carry the current necessary for an arc lamp.

I enclose a sketch of a lamp manufactured by the Edison Swan Company for optical work, and sold by them at ten shillings each.

The sketch is half-size, and it will be seen that the filament is coiled round and round so as to get the light concentrated in the focus of the condenser.



As we have comparatively little heat radiating in this form of light, we can bring it as close to the condenser as the bulb of the lamp will allow, one great advantage being that we do not require a chimney.

In the sketch I have suggested an arrangement of a reflector and a sheet metal cover enclosing the lamp and constituting the body of the lantern; a diaphragm is also shown to cut off any stray rays from the reflector.

The above mentioned lamps are constructed for an E. M. F. of 105 volts 3·3 ampères, and give a light of 100 candles. The lamps in general use for house lighting are run on a circuit of 100 volts E.M.F., so that it is merely necessary to take the lamp nearest our lantern out of the holder and insert a plug constructed exactly the same as the bottom of the lamp taken out, and having two wires of sufficient size to carry 3·3 ampères (without heating) attached to it, and long enough to join on to the lamp in the lantern.

All other lamps in the room must of course be switched out if provided with separate switches, but when, as is generally the case, no switches are provided, they should all be taken out of their holders, or placed in thick brown-paper bags while the exhibition is on.

—:o:—

Flame Extinguishers and Method of Testing.

Tested flame extinguishers consist of tubes filled with finely granulated pumice stone, which allows the gas to pass through, but through which no flame can pass, even when it is an explosive mixture of gas.

These flame extinquishers are in their manufacture tested thus—a small bag is filled with a mixture of oxygen and hydrogen, the gases are lighted, and the pressure is taken off the bag; the mixed gases explode if it does not pass to the stock in the bag, where exerything is made easy for it to do so; they may be considered to confer great additional safety. The use of these extinguishers will no doubt prevent many accidents; they must be used in pairs. Of course, they obstruct the free passage of the gas, and require about one-fourth more weight on the gas bag than without them; they also require now and then to be opened and inspected to see that they are full.

—:o:—

Hints on Enlarging.

By A. R. Dresser.

CHAPTER VI.

The last point we come to is the developing, and this is the most serious of all, for unless one knows how to develop properly good results in their enlargements cannot be obtained. If you can always strike the right exposure when making enlargements in bromide, so much the better, as good results are then certain; but as you may have to enlarge from a variety of negatives, and not all of the same density, it is hard to do so, and so you must learn how to develop so as to counteract any mistake in the exposure. It is impossible to tell any one just how to do it, as it is a sort of knack, and can only be learnt by trials and experience, but I will give hints as to exposure and developers that may be of use.

When exposing, always give enough exposure—that is rather over than under expose, as over exposure can be corrected in the developing if the over exposure has not been too great, but under exposure can never be made good. The only trouble to be found will be when enlarging from a very thin negative; then you must strike about the right exposure, as if you over expose the resulting print will be very flat. With this style of negative you should get the right exposure (and not over-exposure) and use a strong developer; but when enlarging from a good plucky negative you have a good latitude in the exposure and need not fear over-exposure within reason. As a rule, negatives that are fair ones, I say err on the side of over-exposure and correct any mistake when developing. Now comes the question of what developer to employ. Use the iron developer if you want the best results, although you can get fair results with quinone or eikonogen, but certainly the best are got by iron developing. All the various makers of bromide papers send out formulæ and full instructions with the paper, and it is always best to follow that, as the maker should certainly know what is best for his own papers, and if the instructions sent out are followed all should go right.

For those who like to make their own developer I will give the one I use, and they can try it:—

(1) Make a sat. sol. oxalate potash, and make it acid with acetic or hydrochloric acid and number it 1.

(2) Make a sat. sol. of iron, and also make acid with same acid; number 2.

I use for my iron solution, the *double salts* of iron and ammonia as used in the old wet plate days and called the "double salts of iron" or ammonia-sulphate of iron, to be bought at any photographic chemist (this is much dearer than the ordinary iron—about four times the cost). There are great advantages in using the double salts of iron over the ordinary iron as sold, as you can develop two or three prints with the same developer and get good results with all, and again you can mix it ready for use and keep it for weeks and it will retain its developing power. I have used it now for some years and still go on doing so.

(3) Make a 10 per cent. solution of bromide.

Then for use take No. 1, 4oz.; No. 2, 1oz.; No. 3, two or three drops.

This is a full-strength developer. As a rule I take half new developer (as just given) and half old (as I keep my developer and do not throw it away) for use, and in another measure have some developer of full strength, in case I require it to bring up the picture and where you are likely to give over-exposure you should adopt this plan. The main points when developing with iron are to keep the oxalic potash and the iron solutions distinctly acid, and to always use an acid bath, viz.:—Water, 30oz.; acetic acid, 1½ drams, and give two or three washings in the acid bath after developing and before washing.

As to the hypo bath some recommend it to be strong, whilst others weak. I always keep a sat. sol. of hypo, and use one part of this to two parts of water.

As to the other developers—viz., quinone and eikonogen—they will both do fairly well, but are not, in my opinion, so good as the iron developer, and so I stick to the iron; but to those who want to try it, I can only say any formula of quinone will answer. I have tried them all, and find little difference between them, although I must say I prefer one that has not got any caustic potash in it; always use carbonate potash or carbonate soda with your quinone. Eikonogen, I think, works still better than quinone, but hardly up to iron. I use for my eikonogen developer the No. 1 formula as sent out by Marion and Co., viz.:—

No. 1.

Eikonogen	1oz.	Dissolve by boiling in, say, 100oz. of water, and then make up to 60oz.
Sulphite of soda	3oz.	
Water	60oz.	
Carbonate of Soda (washing soda)	3oz.	
Water	20oz.	

For use, mix three parts of No. 1 with one part No. 2. This works well, but I prefer to add a few drops of a 10 per cent. solution of bromide.

I find a very good *one solution* of eikonogen is the one I am now using for trials.

Eikonogen	2oz.	Mix as described before.
Sulphite of Soda	6oz.	
Carbonate Soda	2oz.	
Carbonate Potash ...	1oz.	
Water	90oz.	

This is a strong solution, and will do well for any under exposed prints; but I, as a rule, dilute it with equal quantities of water for use. One requires a few experiments before he is sure of his results; but after you are proficient in the use of the developer it works very well and gives a good black tone. In all cases of developing bromide paper I use a drop or so of 10 per cent. bromide.

Flashes on Lantern Topics.

By Bull's-eye.

It would seem as if the optical lantern is rising to a renaissance. Hardly a place, small or large, but in its returning season has its course of lectures, and invariably one or more of these is illustrated in the now familiar way. That there should be now and again an occasional accident is only what might be expected. One of these took place recently, and I allude to it to point a moral.

A scratch company had taken the Corn Exchange, Kirkaldy, for nothing less than opera, their merits lying more in singing than real acting. The place was fitted up as a theatre—stage, scenery and orchestra, with the inevitable limelight. This was produced by a couple of the usual bags of oxygen and coal gas for hydrogen; each was weighted with a half-hundredweight (56lb.), and they were put in an out-of-the-way corner, and the light directed when necessary on the stage and performers by the one operator and director; but in the middle of the performance there occurred a sudden explosion. All the gas lights were blown out, as well as first the nearest window, then another at the extreme end of the long hall, and almost immediately after another at the stage end opposite.

The scenery caught fire, but was soon put out. Several ladies, young and old, fainted, and there was for a time a panic; but with praiseworthy coolness the gases were relighted, the audience was calmed, and the opera was continued to its close.

The oxygen-bag had exploded, it and the pressure boards being found spread out like an opened book. Great carelessness only could have allowed the pressure board to be caught by some obstruction, and this not being noticed—by some means the hydrogen must have been pressed into the oxygen-bag till the explosive quantity and quality had been arrived at, and the light allowed to be drawn back—the accident occurred.

But a far higher class than these have taken quite kindly to the use of the lantern for illustrating their scientific lectures. The Astronomer Royal for Scotland (Professor Copeland), the successor of the genial C. Piazzi Smyth, has, like the latter, adopted the use of photography and the enlarging lantern in showing such phenomena as the spectra of the temporary stars, thus deducing their composition from their photographed rays, as well as the rates of travel of many of them.

The artists, too, who make no difficulty of sneering at the mechanical art, have no compunction through their representative in using the same instrument and means to illustrate the means by which art was fostered in the dark ages in the monastries and nunneries by the designing, painting, and beautifying the manuscripts, of which we have so many examples, and other works of that nature, done for the love of the subjects, not for the payment received for it.

I am afraid that it will be a long time ere even the newest of the new theories and experiments in the production of photography in colours by Mr. Ives in America, and Mr. Lipmann in France, will be able to help us to have our slides in the true colours of Nature. It would seem that with all the multiplication of words, there has been nothing more done than what we already know, and have even shown by the aid of the lantern and the electric light long ago.

In the otherwise very enjoyable exhibition, at the first popular meeting of the season of the Edinburgh Photographic Society, by Mr. Gambier Bolton of his wild animals, there was one of a very Music Hally type which would be better left out in future exhibitions; it was the first, and a portrait of the lecturer. with the honours, "F.Z.S.," &c., all around him. He had much better not be classed among the animals.

——:o:——

Ether Saturators.

By A. W. Scott.

The past few months have been trying to users of saturators, owing to the temperature being below its usual winter level. Persons who in previous seasons had used ether successfully have been troubled with pops and small explosions of gas in the tubes connecting the saturator to the jet. These pops, though quite harmless, are very startling when they occur unexpectedly. The reason is simple. The warmer the saturator the more highly saturated with vapour is the oxygen passing through, and the more highly saturated the oxygen is, the less explosive, and therefore the less liable to pops, it becomes.

There are two forms of saturators at present in use – one is the double-barrel form, invented by Mr. Ives; the other is Scott's Warm-Air Saturator. If charged with the same fluid, and if both are used cold, there is no difference in the saturating powers of the two forms; but when the warm-air pattern is heated, the saturating power is considerably increased, and this power enables cheaper grades of ether and also benzoline to be employed. The warm saturator is quite safe from pops, when fairly heated and charged with ether; but if charged with benzoline it requires more care, the gas being less highly saturated.

Ives' saturator is capable of 500 candle-power limelight, quite steady and noiseless; if charged with ether at about two shillings the pound, and used with a small-bore jet, it will rarely give pops, unless the weather is frosty, and even then an expert manipulator can easily avoid them.

Pops are due to two causes—an improper jet, or too low a pressure of gas. The jet usually requires adapting to give the best results with ether, and this should be done by the dealer who supplies the saturator.

The low pressure of gas is, however, the chief cause of pops, which occur when the light is being put out. In the case of a coal-gas limelight the practice is to turn off the oxygen tap of jet first, then to turn off the coal-gas tap. Now with ether the opposite course should be invariably pursued; the vapour tap should be turned off first. This alone puts out the light, *without checking* the flow of gas, for the pure oxygen is still blowing on to the lime, and when the lime is cold the oxygen can be safely turned off at the cylinder or gas-bag.

When a pop occurs sometimes a few drops of ether are forced by the shock into the tube leading from saturator to cylinder. Hence this tube should be not less than 5ft. in length, to protect the regulator or gas-bag from the ingress of these drops of fluid.

——:o:——

On "Pressure's" Riddle and Regulators in General.

By Horace Hilton.

This riddle (page 98) is easily explained by the fact that all regulators leak slightly, and I do not think that one could be made that did not leak a little after it has been in use some time.

I will illustrate my remarks by referring to my own regulator. It is one of the ordinary bellows regulators (3in. × 3in. × 2in. wedge), and it leaks away its contents—if charged—in ten minutes. This bellows when expanded has a normal capacity of the $\frac{1}{192}$ part of a cubic foot, so that it would take 1,920 minutes (32 hours) to leak away a cubic foot. Now if my regulator were attached to a cylinder with an intermediate gauge affixed; and if valve was turned and left on, no *appreciable change* could possibly take place in the gauge in the half-hour mentioned by "Pressure," because in that time my regulator would have only leaked away three times its contents, or the $\frac{1}{64}$ part of a foot, and I do not think any gauge would show such a fractional loss. But directly the cylinder valve is turned off the loss at once becomes manifest in the intermediate gauge because the regulator begins to lose its contents, and in consequence the gauge loses its pressure, the gas by back pressure passing off through the closing regulator.

The foregoing calculation, of course, is on the supposition that all connections are gas tight (except where the regulator leaks).

With reference to these regulator leaks, I was for a long time puzzled to know the cause, for I was certain that the bellows themselves were gas tight (and pressure proof), and till very recently had thought it a riddle, but on one being sent me to examine and repair, I soon saw the solution of the riddle. I commenced to examine " the works " in a different way to how a mischievous young rascal once commenced on a pair of bellows. On taking out spring lever and screw-down pivot, I saw that the pressure would force the gas along the screw-threads and out of the regulator, and this on testing I found was the case.

If the screw-threads were well greased (not oiled), probably the escape would be partly checked ; but as it is so trifling—certainly not noticeable in the use of ordinary cylinders—it matters but slightly or not at all.

Should, however, a regulator be much in use, the continual wear on the screw-pivot tends to make the leak increase.

There are, I suppose, about half-a-dozen regulators now in the market ; but for simplicity and for certain advantages in operating, I think the bellows pattern unrivalled, and I shall always use and advocate their use.

In conclusion I strongly advise careful handling, careful using, and careful packing of all regulators. I have found that a little Monkey soap solution, or similar preparation, is wonderfully useful now and then in maintaining a perfect joint between cylinders, unions, adaptors, and regulators.

——:o:——

Fluid in Gas Cylinder.

By Wm. Bishop.

In the March number of the *Optical Magic Lantern Journal* there is a letter from Messrs. J. Edelston and Sons, on the question of fluid in hydrogen gas cylinder, they having had an experience which has perplexed if not alarmed them. The explanation is, I think, easily found, and the occurrence is what might theoretically be expected under the conditions which commonly exist. Coal gas always contains a considerable quantity of moisture, and hydrogen (nominally pure) is in a similar condition from the water carried over in generating and washing. This moisture in cold weather in the case of house gas condenses in our pipes, causing a trouble well-known to gas engineers and fitters, and involving special precautions in extensive lighting arrangements. Comparing this common fact with the conditions of a gas cylinder, we find the moisture of say twenty feet forced (with the gas) into a small space. The heat generated in compressing prevents condensation, but when the cylinder is cold, and especially when extra cold, is generated by the expansion on releasing the gas, this moisture is bound to be deposited in the cylinder, and unless carefully drained out every time of refilling will soon become a considerable quantity. If, as appears to have been the case in question, the cylinder is now exposed to frost—a dangerous practice —the valve will probably be choked by it, and Messrs. Edelston's experience repeated exactly. The lesson to be learned is always to use the cylinder in a more or less vertical position, and always to have it carefully drained each time of filling. That as a rule it is wise to keep cylinders in a fairly equal temperature "goes without saying."

The colour of the liquid would no doubt be due to oxide of iron, and in the case of coal gas to a deposit of carbon in the form of naphthaline.

Correspondence.

THE "ETHOXO LIGHT."

[*To the Editor.*]

Dear Sir,—I have read with interest the communication of Mr. C. Goodwin Norton on this subject, and as I have used the saturator on many occasions without the slightest " hitch," and have been repeatedly asked my opinion of it, some of your readers may also appreciate my experience. While unable to offer any theory as to the experiences of your correspondent, I venture to think that a careful examination of the conditions would reveal the source of difficulty which may be looked for in, (1) Character of ether ; (2) Construction of jet ; (3) Presence of any fluid except that absorbed. No doubt due attention has been given to these points by Mr. Norton, and I refer to them for the benefit only of inexperienced amateurs. Respecting point one, I rely on the reputation of a local chemist, whose care gives me full confidence.

(2) I use a jet with a *very small* aperture.

(3) To avoid the odour of the ether and to ensure perfect saturation, I supply the fluid an hour before I want to light up, allow it to absorb for a quarter of an hour as much as possible, and lastly drain the instrument of every remaining drop.

The result in any case has been that I have always obtained a most powerful light, and confidently assert " the more I use it the better I like it." I should add that I have always employed a bag with 1 cwt. pressure, and with a pair of pumice safety valves immediately behind the jets. That cylinders are equally practicable, I quote from a letter from a friend to whom I lent my saturator, and who used it with a 20ft. cylinder and Beard's regulator on three occasions:—"The ether I find extremely easy to work. I am but a novice, but were I going in for exhibiting, I should certainly use it in preference to others. The light was perfect."

I have not attempted its use with a dissolver, which possibly might introduce an element of difficulty.—Yours faithfully,

E. Baker.

Fiskerton-street, Salisbury.

[*To the Editor.*]

Sir,—In your last issue I read an article by Mr. C. Goodwin Norton, who comes down rather severely on ether saturators, and calls himself an expert, and yet it seems does not understand the proper way to put out the light. Mr. Norton appears to have been using a cold saturator charged with ether out of doors, doubtless in cold weather. As cold diminishes the amount of vapour, this fully accounts for the light being full on when the oxygen tap of jet was turned off. The gas would then be in an explosive condition after leaving the saturator. If he had turned both taps of jet full on, then turned off the vapour tap of jet, there would have been no explosion ; but he got a loud pop by turning off the oxygen tap of jet first, and the vapour tap after. The other explosion indicates that his jet is out of order. For your next issue I shall be pleased to give my experience in working saturators. As so much has been written lately about explosions, which is likely to do the sellers of saturators serious injury, besides striking terror into the minds of amateur lanternists, any person before rushing into print to condemn a thing ought first to learn how to use it.—Yours truly,

W. King.

Friarn-street, Bridgwater.

[*To the Editor.*]

Dear Sir,—*Re* the limelight from oxygen and a saturator, this winter I have given thirty public exhibitions with a limelight lantern and a saturator of my own make and design, and have not had the slightest hitch with respect to the light. I claim to have a light second to no man in England, considering the cost of the lantern I am using, which is of my own design and make. My lantern is fitted with a pair of ordinary plano-convex carriage lamp glasses, 5in. diameter, which cost 1s. 8d. the pair; they are mounted in a paper tube. The lantern has some novel arrangements connected with it. I can show a quarter plate picture either horizontal or vertical in a moment. My saturator is made of copper.

I contend that a saturator is the proper thing to employ along with a cylinder of compressed gas. It is the simplest means of generating a great heat that we have, and it is by far the cheapest and most convenient. At the close of an entertainment, when shutting off the gas, there is a report not louder than the crack of a child's penny pistol, and if a saturator is made as it should be, there is neither danger nor noise of an explosion, and they are just the things that will keep their stand if properly constructed. I may further say that I use no regulator but the screw regulator on the gas cylinder, and I see no use for one if reasonable care be used in working. I have used my lantern out of doors on Feb. 23, in the face of a full moon, and gave a very good picture, with Mr. Dring, of the Manchester City Mission, as lecturer, which took very well.—I am, yours faithfully,

W. LAWSON.

Rectory View, Newton-le-Willows, Lancashire.

THE LANTERN FOR SUFFERING HUMANITY.

HOSPITAL LANTERN SOCIETY.

[*To the Editor.*]

SIR,—Since your last issue I am pleased to acknowledge receipt of a substantial 12ft. screen and stand, from Messrs. Shew & Co., of 88, Newman-street; 10s. 6d. and a set of zoological slides from Mr. H. Kemp; and ten shillings from Mr. C. E. Rendle. Extra operators have volunteered for the cause, and several applications have been received for entertainments during the next few weeks.

Please notify through your columns that we still require two blow-through jets, dissolver, and regulator, to complete the biunial outfit. Slides and additional apparatus will also be welcomed.

Mr. R. Dresser has kindly consented to act as president of this society.—Yours truly,

JOHN J. JONES, *Hon. Sec. and Treas.*

10, Lydon-road, Clapham, S.W.

——:o:——

Notes and Queries.

W. T.—On another page of this issue.

R. B. P.—You will find an article by Mr. Padgham on electric light for lanterns on another page. Perhaps this form will answer your purpose.

Inquirer writes: "Kindly say in your next issue what is the greatest distance from the screen that the blow-through jet can be used without serious loss of light." *Reply.*—It depends upon whether the atmosphere is clear or smoky. 40ft. to 50ft. is a common distance.

Amateur.—You will find a good deal of valuable information in connection with your "mystery" in this issue.

N. N.—(1) The name of the lens does not convey any special meaning; it is an ordinary view lens. (2) Hard limes, from any dealer. (3) Yes, use your portrait lens for the purpose. You could have ascertained by trying it on the lantern.

Quill Driver.—The article you sent us is on mining, and quite unsuited to our columns. Perhaps you intend it for some other paper. If you send us your address, we will return it, or, as it had a London post-mark, perhaps you can call.

G. Jones, W. L. Howard, Robert Wildwood, Edward Altman, S. Wood, Inexperienced, Saturator.—Answers to your questions respecting saturators, &c., will be found in articles in the present issue.

Delighted.—Write to Cutts, Sutton and Co., Sheffield.

Register writes: "May I make one or two suggestions connected with lantern work? It would be very helpful to many of your readers if you would kindly favour us in 'our' journal with descriptive sectional sketches of (*a*) the working of a pressure gauge; (*b*) the valve of a cylinder; (*c*) the valve of a Beard's regulator. I have contrived for my lantern a plan by means of which I can easily 'register' any lot of slides I may happen to have, framed or not. The only imperfection in the working is that which is caused by the want of precision in the position of the mats in the slides. I have often thought what an improvement it would be if those who send out slides on hire would make them up (especially the unframed photos) *without* any mats. We who use them should be provided with suitable carriers, each with a mask, round, square, &c., and this would, of course, answer all the purpose of the mat, avoiding all its irregularities. Each slide should have, on the corner of its face, a white label, with the name upon it, and this label should be round, cushioned, or otherwise, according to the shape of the mask best adapted to that particular slide."

T. Sharp writes: "I wish to make a gasometer to contain oxygen, and shall feel obliged if you will give me the dimensions to hold 10ft. of gas." *Answer.*—2ft. by 2ft. by 2½ft.

Up-Lyme.—(1) The difference in the size of the bottles is of no importance; (2) There is no danger in having one bottle full and the other part full; (3) Should either bottle become empty the light would go out, and there is no chance of an explosion, as you imagine.

Hand Camera.—We cannot say which of your list is the best hand camera. You will find six of them described in our series of articles, *Hand Cameras for Obtaining Slides for the Lantern*, the particulars of each are obtained from actual experience. Read each carefully, and then decide which movement you prefer.

Novice.—(1) An oxy-calcium burner is one in which the flame is produced by a species of spirit lamp, through which a stream of oxygen is blown, causing it to impinge on a lime. A good light can thus be obtained. The price is about thirteen or fourteen shillings. (2) The form of lamp you propose is known as an oxy-calcium lamp. You will find a diagram and description in our issue of September, 1889. Yes, it is safe. (3) If your lens gives a disc of about 11ft. when the lantern is about 15ft. from the screen, it is of 4in. focus. As you want to obtain a disc of about the same size with lantern 45ft. away, you must attach a lengthening tube on the part you speak of, and employ a lens of 12in. focus. If you unscrew your front combination and put it in the place of the back lens, perhaps that may suit your requirements, if you do not want to buy another lens. (4) Bernard and Sons, 19, Berners-street, London, W., publish a shilling book on colouring slides.

W. H. S.—We note what you say about your saturator explosion; you will find a good deal of information on this subject in this issue.

E. B. writes: "Can any kind reader tell me what is the method employed by professional lime-burners? Are they burned and bored with some kind of circular cutter?

M. H.—Thanks for suggestion.

Lantern.—In our next. Thanks; it is very interesting. The process about which you inquire is the Ferrotype. J. Fallowfield, of Charing Cross, publishes a manual on this subject.

B.—In our next.

S. P. Lomas.—See answer 4 of "Novice."

Hydro.—If you use care in regulating the oxygen, gas can be used from the main; we do not recommend it.

Safety.—Quite safe; you must adjust the pressure of each or you will not obtain a good light.

——:o:——

NOTICE.—For want of space we have in this issue been compelled to hold over Society reports and several interesting articles.—EDITOR.